

# Army Guide monthly



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## Defence Industry

government testing.

### ATK Receives \$5 Million Award for U.S. Army's Accelerated Precision Mortar Initiative (APMI)

MINNEAPOLIS -- Alliant Techsystems has received a \$5 million contract from the U.S. Army for the first phase of the Army's Accelerated Precision Mortar Initiative (APMI). ATK is one of three companies selected for the first phase of the competition.

Phase one consists of a three month design, maturation and demonstration program aimed at developing a precision mortar capability. The first phase concludes with flight tests and a competitive "shoot off" amongst industry designs.

Prior to winning the award, ATK successfully concluded a Cooperative Research and Development Agreement (CRADA) flight test program of its Mortar Guidance Kit (MGK) design. ATK's MGK design demonstrated its ability to accurately and reliably guide a 120mm mortar to within 10 meters of targets at ranges in excess of 6,500 meters.

"Our MGK design leverages our proven Precision Guidance Kit (PGK) technology and production facilities already in place for 155mm artillery to quickly deliver an affordable, low risk, precision 120mm mortar capability to the field," said Jack Cronin, President, ATK Mission Systems. "Most importantly, the recent CRADA tests demonstrated that our MGK technology is mature enough to meet our warfighter's urgent operational needs."

ATK's MGK converts M934 mortar bodies into affordable, precision mortar rounds by adding GPS guidance and navigation capability in a package that replaces standard fuzes in the mortar's fuze well. Based on ATK's PGK for 155mm artillery, MGK has more than 90 percent commonality with PGK. The manufacturing of MGK can be accomplished using the ATK PGK production line, providing a rapid low-risk path to fielding.

The U.S. Army is sponsoring APMI to meet operational needs for a precision, 120mm mortar capability for reliable and lethal response to enemy engagements - especially in mountainous terrain inaccessible to artillery. A precision guided mortar provides field commanders with indirect fire capability to successfully engage targets while mitigating collateral damage. Additionally, greater accuracy reduces the number of rounds required to successfully defeat targets while reducing in-theater logistical requirements.



The new software, called Joint Capabilities Release (JCR), provides a common FBCB2 platform solution for both the Army and U.S. Marine Corps.

FBCB2 is the key situational awareness and command-and-control system used by U.S. and coalition forces in Iraq and Afghanistan. More than 85,000 FBCB2 systems have been deployed worldwide.

Northrop Grumman completed system segment acceptance testing and delivered JCR to the U.S. Army Communications-Electronics Command, Fort Monmouth, N.J., on September 25.

"The JCR enhancements and added interoperability expand FBCB2 to a robust system that is orders of magnitude more capable than what is available to soldiers and Marines today," said Joe G. Taylor, Jr., vice president of the Ground Combat Systems operating unit within Northrop Grumman's Information Systems sector. "The improvements in latency alone will make a tremendous difference on the battlefield."

The current version of Blue Force Tracker (BFT) takes minutes to refresh friendly force position locations. When JCR is fielded with the new BFT-2 transceiver and network upgrade, friendly positions will be updated in seconds.

Other new JCR features and functions include a commercial joint mapping tool kit; Type 1 encryption for relaying classified information; and an over-the-air "self descriptive situational awareness" (SDSA) capability.

SDSA will eliminate inflexible fixed databases -- one of the biggest complaints of the old system - and allow FBCB2-equipped units to change task organizations in the field to meet new mission requirements. Future JCR releases will provide additional services including open office file transfers, image downloads, chat and instant messaging.

Northrop Grumman developed JCR using an approach based on a common set of core assets, making it more modular, reusable, interoperable and easier to upgrade. This Battle Command Product Line (BCPL) architecture is capable of supporting multiple products for a variety of users, including aviation, dismounted soldiers, logistics and fires.

FBCB2 links communication devices, sensors, vehicles, rotary-wing aircraft and weapons platforms in a seamless digital network to provide a clear, continuous and common picture of the battlefield. Most FBCB2 systems communicate via a satellite-based network; about 30 percent use the Enhanced Position Location Reporting System, or EPLRS, tactical radio network.

The company was awarded the first FBCB2 development contract in January 1995.

Northrop Grumman Corporation is a leading global security company whose 120,000 employees provide innovative systems, products, and solutions in aerospace, electronics, information systems, shipbuilding and technical services to government and commercial customers worldwide.



## Defence Industry

### Northrop Grumman Delivers Next-Generation FBCB2 Software to U.S. Army

RESTON, Va. -- Northrop Grumman Corporation (NYSE:NOC) has delivered the next version of Force XXI Battle Command Brigade and Below (FBCB2) software to the U.S. Army to begin formal

**Defence Industry**

**NLOS-LS Team Uses Warhead To Defeat Stationary Target**

NetFires LLC, a joint venture between Raytheon Company and Lockheed Martin, completed a test flight of the Non Line-of-Sight-Launch System's Precision Attack Missile using a warhead.

The PAM missile was launched from the NLOS-LS container launch unit (CLU) and used its on-board, semi-active laser seeker to detect, lock on and destroy a stationary BM-21 rocket launcher at a range of 38 kilometers (23.5 statute miles).

"For months we've been testing NLOS-LS against stationary and moving targets in various scenarios using telemetry systems," said Scott Speet, executive vice president of NetFires LLC and Raytheon's NLOS-LS program director. "Demonstrating the system's capability with a warhead in a tactical scenario is the culmination of years of hard work. The success of this test means we're only steps away from putting this capability in the hands of soldiers and sailors."

During the test, the PAM missile received a tactical representative target location error, joined the network with its on board radio and operated as a node on the net throughout the flight. Prior to impact, the missile sent back a terminal target image to the Advanced Field Artillery Tactical Data System.

"NLOS-LS is a platform-independent system solution that gives the brigade combat team (BCT) commander unprecedented organic, precision indirect fire support," said Anne Johnson, president of the NetFires LLC and Lockheed Martin's NLOS-LS program director. "Demonstrating the total system success of the CLU and the PAM missile with a warhead against a threat target is a significant milestone in this program's development."

NLOS-LS takes targeting information from the command and control cell and sends it to the NLOS-LS CLU's computer and communications system for initial missile targeting. The missile can also use the command and control cell's targeting information for in-flight updates.

"This test proves NLOS-LS is going to revolutionize the BCT's ability to strike targets with beyond line-of-sight lethality for both stationary and moving targets," said Col. Doug Dever, the U.S. Army's NLOS-LS project manager. "Soon soldiers and sailors will be able to capitalize on the incredible mission assurance that NLOS-LS provides."

Raytheon Company, with 2008 sales of \$23.2 billion, is a technology and innovation leader specializing in defense, homeland security and other government markets throughout the world. With a history of innovation spanning 87 years, Raytheon provides state-of-the-art electronics, mission systems integration and other capabilities in the areas of sensing; effects; and command, control, communications and intelligence systems, as well as a broad range of mission support services. With headquarters in Waltham, Mass., Raytheon employs 73,000 people worldwide.

Headquartered in Bethesda, Md., Lockheed Martin employs about 146,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation reported 2008 sales of \$42.7 billion.

**Defence Industry**

**Oshkosh Corporation Commemorates Handoff of 1,000th M-ATV to U.S. Armed Forces**



OSHKOSH, Wis.-- Oshkosh Corporation (NYSE:OSK) marked the handoff of the 1,000th MRAP All Terrain Vehicle (M-ATV) to the U.S. Armed Forces on Nov. 30 at a ceremony with military leadership at the company's facilities in Oshkosh, Wis.

Brig. Gen. Michael Brogan, commander of the Marine Corps Systems Command, and Lt. Col. Coll Haddon, M-ATV product manager for the MRAP Joint Program Office, were the keynote speakers at the event. Having exceeded the government's delivery schedule for five consecutive months, Oshkosh is ramping up production to 1,000 vehicles per month in December and continuing at that level through April 2010.

"We understood the urgency of the M-ATV program to save American lives and leaned forward in advance of receiving the contract to build vehicles and prepare our operations for this high-quantity production," said Robert G. Bohn, Oshkosh Corporation chairman and chief executive officer. "Our workforce has embraced this important mission and made countless personal sacrifices to produce these vehicles quickly to protect those that are sacrificing for our safety. They will continue to deliver these life-saving vehicles along with replacement parts and field support, as long as necessary."

Since being awarded the production contract on June 30, 2009, Oshkosh has received four additional awards from the U.S. Army Tank-automotive and Armaments Command Life Cycle Management Command (TACOM LCMC) to supply a total of 6,219 M-ATVs. Oshkosh also has received orders for spare kits and to send its factory-trained field service representatives (FSR) to Afghanistan to provide training and maintenance support for the vehicles. The aggregate amount of the five awards is valued at \$3.2 billion.

The M-ATV is the U.S. military's newest MRAP model, combining the protection levels of legacy MRAPs with improved mobility and durability to handle

Afghanistan's mountainous cross-country terrain and unimproved roads. The vehicle uses the Oshkosh-patented TAK-4® independent suspension system, which has undergone more than 500,000 miles of government testing, to achieve a 70-percent off-road profile capability and 16 inches of independent wheel travel. The system also is used on the Marine Corps' Medium Tactical Vehicle Replacement (MTVR) and Logistics Vehicle System Replacement (LVS), as well as the Army's Palletized Load System (PLS A1).

Existing Oshkosh Defense manufacturing facilities have available production capacity for all current and pending military vehicle programs, including the M-ATV and the U.S. Army's Family of Medium Tactical Vehicles (FMTV), as well as any surges in production.

Oshkosh Defense teamed with Plasan North America to provide an advanced armor solution for the M-ATV. Plasan also developed the armor system used on more than 5,000 legacy MRAPs and thousands of Oshkosh MTVR Armored Cabs already in theater.

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### Defence Industry

#### CACI to Upgrade US Army's ISR Common Ground Systems

CACI International in Arlington, VA received a \$24 million task order to provide program management and technical engineering services to upgrade the Common Ground Systems (CGS) with subsystems from the US Army's Distributed Common Ground System-Army (DCGS-A) ground mobile system.

The DCGS-A integrates intelligence, surveillance, and reconnaissance (ISR) data within a single system to streamline the Army's ability to process and disseminate the data to commanders in the field.

CACI received the 18-month award under its Strategic Services Sourcing (S3) contract with the Army....

The S3 contract is a \$19.25 billion indefinite delivery/indefinite quantity performance-based contract awarded by the US Army Communications-Electronics-Life Cycle Management Command (CECOM LCMC) Acquisition Center on March 2/06 to 7 vendors with a 5-year base period and a 5-year option period.

The 6 other prime contractors for the S3 contract are Booz Allen Hamilton, Computer Science Corp., Sensor Technologies, Lockheed Martin, USfalcon, and Viatech.

Using the ISR data provided by the DCGS-A, field commanders gain a better situational understanding of their environment. This includes visualizing and analyzing imminent threats, predicting threat intentions, and developing countermeasures.

According to Stephen J. Bond, writing in the July-September 2004 issue of Military Intelligence Professional Bulletin:

"DCGS-A is more than just a consolidation of our current ground processing capabilities. It will interoperate and network with other Service's DCGS, as well as with databases and systems owned and operated

by the national Intelligence Community. DCGS-A will leverage national and Joint ISR capabilities down to joint task force (JTF)-level, into Army Units of Employment (UEs), Units of Action (UAs), and into the Future Combat System (FCS), the future Battle Command System (BCS), and Land Warrior. It will also enable information-sharing with our coalition partners.

As the ISR processing component of the future BCS and a complementary system to FCS, DCGS-A will facilitate providing near-real-time (NRT) information and visualization for every echelon, providing the threat, the "unknown" variables of the contemporary operating environment (COE), terrain, and weather slices of the common operational picture (COP). It will enable collaboration and "reach" at multiple echelons, allowing users to reach to an analytical center, including to a national Intelligence Community analytical element or "Knowledge Center" as necessary."

The upgraded CGS will provide US soldiers with improved means of receiving, processing, and sharing intelligence data in a mobile, tactical environment. The CACI S3 team, which consists of 54 members, will develop and integrate software and provide lifecycle management for the CGS. CACI will perform budget and program financial analysis, manage and train system users, and provide logistical support.

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### Training And Simulators

#### Cubic and Thales Introduce MRAP Vehicle Trainer

ORLANDO, Florida -- The defense segment of Cubic Corporation (NYSE: CUB) and Thales USA unveiled their new Reconfigurable MRAP Vehicle Trainer during a joint news briefing today at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC) in Orlando.

The virtual trainer will allow troops to practice clearing convoy routes of improvised explosive devices (IEDs) and other weapons and hazards through realistic immersive simulations of battlefield conditions including weather, terrain, allied and enemy vehicles, opposing forces and weapons ranging from small arms to rocket-propelled grenades and IEDs. Initially, the Reconfigurable MRAP Vehicle Trainer will replicate the Buffalo MPCV (Mine-Protected Clearance Vehicle), Husky VMMD (Vehicle-Mounted Mine-Detector Systems) and RG-31 MMPV (Medium Mine Protected Vehicle).

Designed for use in a trailer, the trainer includes a gunner's turret, vehicle cab, motion platform, instructor operator station, power generation, heating and air conditioning. Cubic's Orlando-based Simulation Systems Division will manufacture the gunner's turrets and vehicle cabs and supply training software featuring complex scenarios based on physics-based models. The weapons include have accurate ballistics and recoil to provide fidelity identical to the weapon being emulated.

Thales is offering two of its high-performance, rugged,

low-maintenance Modular Electrical Motion Systems (MEMS) as the motion platform systems for the different variations of the reconfigurable trainer. The MEMS 3 has a 1,500 kg payload capability and three degrees of freedom with pitch, roll and heave. The MEMS 6 has six degrees of freedom and a payload capability up to 2,000 kg with pitch, roll, heave, yaw, sway and surge. The low profile of these systems allows troops to enter and exit the vehicle cabs easily. Superior visual correlation and vehicle dynamics software reduce the risk of motion sickness during training.

Cubic's Simulation Systems Division in Orlando will perform the final systems integration of the vehicle cabs and turrets with the motion platform.

and one in Afghanistan. To date, General Dynamics has delivered nearly 3,000 vehicles and trained more than 19,000 soldiers in their use.

Stryker Brigade Combat Teams have operated with historically high mission availability rates in Iraq since October 2003, demonstrating the value of a force that can move rapidly as a cohesive and networked combined-arms combat team, Stryker is a family of eight-wheel drive combat vehicles that can travel at speeds in excess of 60 mph on highways, with a range of 312 miles. Stryker operates with the latest C4ISR equipment and an integrated armor package to protect soldiers against improvised explosive devices, rocket propelled grenades, and a variety of infantry weapons.

### Contracts

## General Dynamics to Modernize Stryker Family of Vehicles

STERLING HEIGHTS, Mich. -- The U.S. Army TACOM Lifecycle Management Command has awarded General Dynamics Land Systems a \$203 million contract to design the Stryker of the future.

The Army announced an initial \$42.6 million increment of this award on Nov. 25.

"Strykers have performed exceptionally well for the U.S. Army over more than 25 million miles of combat experience," said Mike Cannon, senior vice president of Ground Combat Systems for General Dynamics Land Systems. "This contract reflects the Army's desire to build on that strong performance by incorporating the latest crew-protection technologies, as well as more power, mobility, agility and information connectivity, into a platform that will continue to be a critical part of the Army's force structure through the foreseeable future."

Cannon said the modernization program will significantly increase the capabilities of the Stryker fleet and assure compatibility with the light and heavy forces. The award continues the Stryker modernization program, initially awarded to General Dynamics in 2008. Work will be performed in Sterling Heights, Mich.

Under the contract, the Army and General Dynamics will develop designs and build a demonstrator to assess options for continuing to enhance survivability, power, suspension, mobility and lethality, and the integration of new technologies – core enabling capabilities – for the Stryker. Mobility enablers include analysis of adding a 450 horse power diesel engine, upgrading the suspension system and driveline to carry a 60,000-lb. payload, larger tires and a new braking system. Work also includes design of a digital architecture system that connects new command, control, communication, computers, intelligence, surveillance and reconnaissance technologies, to ensure soldiers continue to have access to the best available situational-awareness and mission systems.

The Army has seven Stryker Brigade Combat Teams, three of which are deployed in combat zones: two in Iraq

### Contracts

## General Dynamics Awarded USD\$2.2 Billion Contract for Light Armored Vehicles



The U.S. Army TACOM Life Cycle Management Command, in support of the U.S. Army Security Assistance Command (USASAC), has awarded a USD\$2.2 billion contract to General Dynamics Land Systems-Canada for 724 Light Armored Vehicles (LAV) for a Foreign Military Sale (FMS).

Vehicle deliveries will begin in April 2011. General Dynamics Land Systems, the Canadian company's parent corporation, is a business unit of General Dynamics. The contract was signed through the Canadian Commercial Corporation, a Crown Agency of the Canadian Government.

Dr. Sridhar Sridharan, senior vice-president of General Dynamics Land Systems-Canada, said, "We are pleased to be working once again with TACOM and USASAC in support of their Foreign Military Sales program. This contract now allows us to immediately start work on variant design and production readiness. We look forward to reaching the manufacturing portion of this contract which will help us bring stability to our production workforce."

Vehicles provided under this contract will be the LAV II version – a 300 horsepower 8x8 vehicle with a gross vehicle weight of up to 32,000 lbs (14,500 kg). The vehicles will be produced in 10 different variants.

**Contracts****Textron to Deliver 39 Armored Personnel Carriers to Colombia**

New Orleans -- Textron Marine & Land Systems, an operating unit of Textron Systems, a Textron Inc. company, has been selected by the Colombian Ministry of Defense to produce and deliver 39 Armored Personnel Carriers (APC) for the Colombian Army.

The Colombian Army's initial requirement for armored wheeled vehicles with associated logistics support will be contracted through the U.S. Army Foreign Military Sales process. The total value of this procurement is \$45.6 million.

Textron Marine & Land Systems' armored personnel carrier is one of several armored wheeled vehicle configurations that it designs and produces. Textron Marine & Land Systems has designed and produced more than 2,400 Armored Security Vehicles (ASV) and APC vehicles for the U.S. Army, Iraq and Bulgaria. The armored personnel carrier that will be delivered to Colombia is equipped with a cupola mounted weapons station configured with either a .50 caliber machine gun or MK-19 40mm grenade launcher.

"Our ASV and family of vehicles have an impressive track record around the world and are vital to U.S. and coalition forces in Iraq and Afghanistan," said Textron Marine & Land Systems Senior Vice President and General Manager Tom Walmsley. "These vehicles will serve our Colombian allies well in the preservation of Colombia's peace and security."

The ASV and APC have maintained exceptional operational readiness and combat availability rates over more than five years of combat operations. Textron Marine & Land Systems has achieved more than 51 consecutive months of on-time delivery to the U.S. Army on the ASV program.

The ASV and APC are 4X4 wheeled armored vehicles that offer significant crew protection through the employment of multiple layers of armor, defending against small arms fire, artillery projectile fragments, Improvised Explosive Devices (IEDs) and land mines. These vehicles possess superior mobility, agility, handling and ride quality through the utilization of a four-wheel independent suspension system.

The ASV and APC vehicles perform a wide variety of missions including scout, infantry personnel carrier, reconnaissance, command and control and recovery. U.S.

Army ASV missions include operations with the Military Police, convoy protection, perimeter security, as well as Field Artillery Combat Observation and Lasing Teams (COLT) with the M-1200 ASV configuration.

**Defence Industry****General Dynamics Awarded \$18 Million for Saudi Tank Work**

STERLING HEIGHTS, Mich. -- General Dynamics Land Systems, a business unit of General Dynamics, was awarded \$17.6 million for the purchase of long-lead materials that will be used to convert 15 M1A2 Abrams tanks to M1A2S tanks for the Kingdom of Saudi Arabia. The contract was awarded to General Dynamics by the U.S. Army TACOM Lifecycle Management Command for the Royal Saudi Land Forces.

The contract is an addition to a \$58 million 2008 award to General Dynamics to design, develop, convert, implement and test a hybrid configuration of the M1A1, M1A2 and M1A2 System Enhancement Package (SEP) tank variants. The M1A2S vehicles will possess defined capabilities that increase lethality while limiting obsolescence. The work will be performed at the Lima Army Tank Plant in Lima, Ohio, with an estimated completion date of March 31, 2012.

General Dynamics, headquartered in Falls Church, Va., employs approximately 92,300 people worldwide. The company is a market leader in business aviation; land and expeditionary combat systems, armaments and munitions; shipbuilding and marine systems; and information systems and technologies. More information about General Dynamics is available online at [www.generaldynamics.com](http://www.generaldynamics.com).

**Defence Industry****Oshkosh Corporation Awarded Additional \$175 Million Order to Supply 400 M-ATVs**

OSHKOSH, Wis. -- Oshkosh Corporation announced today it has received an additional \$175 million order from the U.S. Army Tank-automotive and Armaments Command Life Cycle Management Command (TACOM LCMC) to deliver 400 MRAP All Terrain Vehicles (M-ATV). To date, Oshkosh has received six awards valued at \$3.3 billion to deliver a total of 6,619 M-ATVs.

Oshkosh continues to exceed the accelerated delivery

schedule with unprecedented production efforts at its manufacturing facilities. The company has ramped up production to achieve 1,000 vehicles per month in December and this new award will extend production into May 2010.



“We are honored to build these M-ATVs that will help save Warfighters’ lives in Afghanistan. Our employees understand the importance of this program. There is an unfaltering commitment and tremendous persistence at Oshkosh to answer our customer’s needs,” said Robert G. Bohn, Oshkosh Corporation chairman and chief executive officer. “With world-class manufacturing capabilities, available capacity and a highly skilled workforce, we continue to be prepared to meet the needs of the U.S. Armed Forces for the M-ATV and other programs, however large the order or complex the vehicle.”

The Oshkosh® M-ATV achieves superior off-road mobility through the incorporation of the Oshkosh-patented TAK-4® independent suspension system, which has undergone more than 500,000 miles of government testing and is used on more than 10,000 Medium Tactical Vehicle Replacements (MTVR). The TAK-4 system provides 16 inches of independent wheel travel and a 70 percent off-road profile capability. Oshkosh also has received orders to supply more than 2,400 TAK-4 systems for legacy MRAP upgrades for improved off-road mobility in Afghanistan.

The Oshkosh M-ATV launch team, which has exceeded M-ATV delivery requirements for five consecutive months, was a recipient of 2009 Defense Manufacturing Excellence Awards from the National Center for Advanced Technologies.

Oshkosh Defense teamed with Plasan North America to provide an advanced armor solution for the M-ATV. Plasan also developed the armor system used on more than 5,000 legacy MRAPs and thousands of Oshkosh Medium Tactical Vehicle Replacement MTVR Armored Cabs already in theater.

Existing Oshkosh Defense manufacturing facilities have production capacity for all current and pending military vehicle programs, including the M-ATV and the U.S. Army’s Family of Medium Tactical Vehicles (FMTV), as well as any surges in production.



### Future Technologies

## QinetiQ pushes boundaries in battery technology for Hybrid and Electric vehicles

The Reduced cost Li-Ion (RED-LION) project – a two-year collaboration between QinetiQ and Ricardo with part-funding from the Department for Transport under the UK Energy Saving Trust Low Carbon R & D programme – has demonstrated the potential of a new low cost Lithium-Ion cell chemistry and associated flexible battery management system for Hybrid Electric vehicles (HEVs).



The aim of the project was to develop an alternative Lithium-Ion (Li-Ion) cell chemistry that could be integrated within an HEV using a bespoke battery management system. Following completion of the project, the partners have announced that a battery pack using QinetiQ’s new and innovative iron sulphide-based cell chemistry and Ricardo’s latest advanced Battery Management System, has demonstrated significant cost and weight reductions compared with the reference Efficient-C full hybrid vehicle.

To prove the potential of the alternative cell chemistry, the RED-LION project set out to replace the battery pack used in the Efficient-C prototype HEV with one using new cells capable of demonstrating suitable material cycle life, capacity, specific energy, rate capability and safety. Custom cells were manufactured and packaged within a bespoke battery pack incorporating many novel features. Ricardo designed the overall battery pack to directly replace the existing unit, developing a new battery management system to manage the iron sulphide chemistry.

The prototype cells, designed and manufactured wholly by QinetiQ, have been shown to deliver a cycle life of over 1,000 cycles at a limited depth of discharge. The high charge/discharge rate capability shown by the particular cell design would make it suited to both HEVs and low-range Plug-in Hybrid Electric Vehicles (PHEVs). Comparing the performance of the prototype high rate cells with the cells originally used in the Efficient-C HEV, a 20% reduction in weight, on a Wh/kg basis, was achieved.

Furthermore, QinetiQ estimates that significant cost savings are possible in comparison with current commercial production Li-Ion chemistries through cheaper raw materials and a more energy efficient patented manufacturing process.

Another key innovation of the RED-LION project is the new battery management system, developed by Ricardo based on a bespoke architecture, which is fully adaptable to a range of cell chemistries and battery architectures. Ricardo has fully integrated its system into a battery pack containing the QinetiQ cells. The pack

includes a number of innovations to improve performance and reduce cost, which are the subject of three Ricardo patent applications.

The project has demonstrated the potential of the cell chemistry within an HEV environment. Whilst the current cell is most suited to HEVs and low-range PHEVs due to its high charge/discharge rate capability, the inherently high energy density exhibited by the chemistry combined with other anticipated improvements, would make it a strong candidate for all-electric vehicles, not least due to its highly attractive cost versus energy-density benefit.

Commenting on the conclusion of the RED-LION project, Neville Jackson, Ricardo group technology director, said: "By combining a new Li-Ion battery cell chemistry with our innovative battery pack and management system technology, the RED-LION project has demonstrated that an iron sulphide-based cell chemistry is a viable energy storage solution for hybrid vehicle use. Ricardo is pleased to have been able to work with QinetiQ, with the support of the Energy Saving Trust, to deliver these very promising results."

Mark Roberts, strategic market team director, energy & environment at QinetiQ, said: "One of the most exciting aspects of this new Lithium-Ion cell chemistry is its flexibility, being customisable for both high power and high capacity applications. Not only could this improve performance in existing HEVs through reduced cell size and weight, but also make all-electric vehicles a more credible proposition by increasing range. And because iron sulphide-based cell chemistry is cheaper to produce than traditional cobalt cells, lower production costs could make hybrid and all-electric vehicles more affordable in the future."

### Defence Industry

#### Supacat SPV400 undergoes blast testing



The Supacat SPV400 development programme has passed a major milestone having successfully undergone blast testing on 3rd and 4th December. The full technical specification of these tests cannot be revealed for security reasons, however, a significant under-vehicle mine blast simulation was conducted as was a huge Vehicle Borne Improvised Explosive Device (VBIED) simulation.

The results were exceedingly impressive and surpassed expectations.

The SPV's integrated protection system comprises of a

composite crew pod, developed in conjunction with NP Aerospace, mounted on a V-shaped hull. The integrated V-shaped hull successfully deflected the majority of the blast away from the vehicle proving the SPV400's crew and system survivability capabilities. The system also withstood the effects of the VBIED.

"These tests have broken new ground for vehicles of this size and have proven Supacat's design philosophy for delivering state of the art lightweight and agile protected vehicles for 21st Century operations", said Nick Ames, Managing Director, Supacat Ltd.

### Defence Industry

#### General Dynamics Awarded \$14 Million for Iraqi Abrams Tank Work

STERLING HEIGHTS, Mich. -- The U.S. Army Tank and Automotive Command has awarded General Dynamics Land Systems, a business unit of General Dynamics, a contract worth \$14 million to purchase long-lead materials for the production of 140 M1A1 SA (Situational Awareness) tanks for the Iraq program.

The SA enhancements to the M1A1 for Iraq include a second-generation forward-looking infrared (FLIR) thermal sight, a driver's vision-enhancer thermal viewer and Tank Urban Survivability Kit (TUSK) improvements, which provide better crew protection in urban warfare environments. In addition, engines developed through the Army's Total Integrated Engine Revitalization (TIGER) program will be installed and pulse-jet filter cleaning systems added to improve performance while reducing maintenance requirements and costs.

Work will be performed in Lima, Ohio; Scranton, Pa.; Anniston, Ala.; and Tallahassee, Fla. The completion date for the contract is May 31, 2011.

### Defence Industry

#### Chinese tanks with Ukrainian engines took part in parade in Peru



New Chinese tanks MBT-2000 took part in parade in the Peruvian capital Lima on December 8, 2009.

Recently Peru has displayed interest in procurement of new systems of armament. This is linked with increase of military power of neighboring Chile.

In particular, local military consider the variant of



procurement of 80 to 120 new tanks in 2010. According to the Peruvian printed media, they have already acquainted with Chinese Type 90 and MBT-2000, Serbian M-84, Russian T-90 and Ukrainian Oplot and Yatagan.

Earlier, in spring of 2009, Poland presented its tank PT-91 at the military exhibition in Lima. After the exhibition it has been left in the Peruvian army for trial operation.

And now, China has handed over some of its MBT-2000 tanks to this country. It is worth mentioning that the Ukrainian-made engine-transmission plant with 6TD-2 engine of 1200 h.p. is used in these tanks. These engines have proved to be good in the conditions of high mountains and high temperatures. Peruvian crews that had been trained before, drove the tanks at the parade.

Such move will substantially increase the chances that it will be Chinese tanks that Peru may procure in future. And this refers not only to new tanks but also to modernization of the fleet of 300 tanks T-55 that Peru is presently armed with.

However, in Ukraine they state that did not give permission to China to use its engine-transmission plants for supply to other countries. Moreover, Ukraine offers its equipment to Peru and in future will see that Ukrainian components wouldn't be supplied there by any other means.

BAE Systems, as the prime contractor, along with subcontractors Force Protection, Inc., based in Ladson, S.C., and Spartan Chassis, Inc., headquartered in Charlotte, Mich., will manufacture and produce the ILAVs in three configurations: the basic ILAV troop carrier; a configuration that includes an interrogation arm for route clearance; and an explosive ordnance disposal configuration. The second-generation ILAVs are an improved version from the original Indefinite Delivery/Indefinite Quantity (IDIQ) contract received in 2006.

The 4x4 ILAV leverages proven designs and includes a V-shaped hull designed to deflect the force of explosions away from passengers. ILAVs have been delivered to U.S. forces for training vehicles and are also in use with the Yemen military. BAE Systems has delivered 607 ILAVs to date.

BAE Systems will begin delivering the vehicles in May 2010 with final deliveries expected by October 2010.

### Future Technologies

## Rheinmetall wins contract for high-tech infantry system: Future Soldier – Expanded System goes into preproduction



The German government has contracted with Rheinmetall Defence of D sseldorf to manufacture a preproduction version of the company's Future Soldier – Expanded System, or IdZ-ES.

### Contracts

## BAE Systems Receives U.S. Army Contract to Manufacture 109 Iraqi Light Armored Vehicles



YORK, Pa. -- BAE Systems has received a \$59 million contract from the U.S. Army Tank-automotive and Armaments Command for the production of 109 second-generation Iraqi Light Armored Vehicles (ILAV) and 10 Mine Roller Kits.

These vehicles are being built for delivery to the Iraqi Ministry of Defense and Interior.

"This is a survivable, mobile and capable light armored vehicle that will help facilitate the successful transfer of missions from U.S. forces to Iraqi forces and enhance the nation's efforts to strengthen the Iraqi military," said Mark Signorelli, vice president and general manager of New Vehicles & Amphibious Systems for BAE Systems. "We are pleased to provide the Iraqi Light Armored Vehicles designed to meet the needs of the Iraqi military forces."

The order represents a major milestone on the path to equipping the Bundeswehr with this state-of-the-art infantry system. A contract covering the multi-million euro order has now been signed at the Federal Agency for Defence Technology and Procurement (BWB) in Koblenz.

Rheinmetall's Defence Electronic division has thus scored a significant new success in the process of creating IdZ-ES, the world's most advanced infantry system.

The "Expanded System" shares the same origins as the basic "Future Soldier" system that preceded it, which the Bundeswehr procured in 2005 as a first step in meeting an urgent operational requirement.

In the face of stiff national and international competition, Rheinmetall won the order to design the "Expanded System" in mid 2006. The new version is intended to eliminate certain deficiencies identified in the

basic system, particularly with regard to command and control capabilities and combat effectiveness.

But IdZ-ES is more than a mere add-on or extension of the basic system. Based on an expanded user requirements profile and new findings resulting from extensive trials, it really represents a new system in its own right.

After supplying system demonstrators in 2008 as agreed, knowledge gained during the now-completed risk reduction phase flowed into the specifications for the preproduction system, the contract for which has just been awarded.

Based on this preproduction system, proof of producibility is to be presented at the beginning of 2011, a key prerequisite for the start of full-scale serial production in 2012.

The award of the preproduction contract thus constitutes a significant step toward equipping German infantrymen with a groundbreaking system that will substantially enhance the combat effectiveness of the country's armed forces.

An outstanding feature of the IdZ-ES is its comprehensive approach, which takes full account of the complex operational requirements army planners now impose on modern soldier systems. IdZ-ES is designed to bring a 10-man infantry section and its vehicle into the command loop of network-enabled operations. This network, consisting of reconnaissance assets, command and control components and fires, enables swift exchange of information, facilitating the creation of a common relevant operational picture, which forms the foundation for planning and executing military operations.



On his helmet display, the soldier receives all the data he needs regarding the tactical situation, the location of friendly forces, his mission and the status of the system, which also includes GPS, an inertial navigation system and a magnetic compass. In terms of design, the system is more ergonomic than ever, featuring reduced weight, greater miniaturization and improved integration of individual components.

IdZ-ES's modular battle dress, body armour, and carrying system makes sure that soldiers can execute their missions even in extremely difficult operating conditions, providing protection from visual and infrared detection, the effects of the weather, and bacteriological and chemical agents. Flame-retardant materials and

protection against insect bites further enhance the overall level of user comfort and safety. Integrated into the system is a compact electronic backpack element, containing the radio, soldier backbone computer, portable C4I computer for the section/squad leader and the GPS module.



## Defence Industry

### SOE KMDB will supply armored personnel carriers to Iraq



The first deputy to Secretary of the National security and defense council Stepan Gavrish informed that on December 11 Ukraine concluded the first among a series of large-scale contracts for supply of armaments to Iraq to the amount of more than \$550 mln.

According to him, the contract envisages the supply of more than 400 armored vehicles within three to three and a half years.

The contract has been concluded by the leading armored equipment production enterprise of Ukraine – State owned enterprise Kharkiv Morozov Machine Building Design Bureau through intermediary of the Foreign trade company Progress.

Armored personnel carriers BTR-4 in several versions as well as special support vehicles, training facilities, service and support will be supplied to Iraq.

Prior to conclusion of the contract, the Iraqi side got acquainted with the whole range of equipment that is offered today in the market. The Ukrainian equipment attracted the customers by a good combination properties inherent in former Soviet equipment – simplicity, reliability, inexpensive servicing with high specifications that do not yield to modern western equipment.

Armored personnel carrier BTR-4 possesses high mobility that is ensured by 500 hp Ukrainian made 3TD engine. In its base configuration it is armed with a Grom weapon station whose armament – 30 mm gun, automatic grenade launcher, 7.62 mm machine gun and 4 anti-tank missile launchers is fully stabilized in two planes.

The vehicle layout is similar to Pandur, Piranha and AMV — the driver and commander are sitting in the front of the hull, the engine is in the middle, troops are in rear. The troops egress is through the rear door.

The vehicle has a modular protection design. In its base configuration it is protected from small arms of 7.62

mm armored piercing balls from any distance. Besides, one of the additional protection sets can be installed in field conditions. The first one is for urban conditions. It is a bar armor to protect from hand grenade launchers and additional mine protection. For use in open space – it is an additional ballistic protection from ammunition up to 30 mm in caliber.

In addition to powerful protection and armament, BTR-4 also possesses amphibious characteristics.



## Exhibitions

### Barco to Exhibit Latest Technology at International Armoured Vehicles

LONDON, UK -- Visualisation solution specialist manufacturer Barco are set to exhibit their latest technology at International Armoured Vehicles, taking place 1 – 5 February 2010, at the ExCel Centre, London.

The challenging nature of 21st century warfare has resulted in operators being confronted with an increasing amount of information in support of making mission critical decisions. In a dynamic, real-time scenario, there is also a danger of information overload for an operator attempting to consume and interpret such large volumes of imagery. As a result, Barco's technology provides better situational awareness, better response time for operators and decision makers, and increased survivability.

Barco are set to showcase their new IP-based 360° awareness solutions for armored vehicles, which gather information from a collection of sensor sources and present this to the operator. Visualisation tools and programmable Human Machine Interfaces (HMIs) make it easy for the operator to focus both on the big picture and on a specific area of interest. User-friendly screen layouts combined with technologies like stabilisation and sensor fusion allow rapid recognition of information in the blink of an eye. This is an essential requirement as a result of operators in current challenging security environments being confronted with an increasing amount of information in support of making mission critical decisions.

Barco will be joined by 90 other exhibitors at International Armoured Vehicles, which is the only international exhibition and conference dedicated exclusively to the armoured vehicle community. The event brings together senior military and industry experts, providing opportunities to gain expert insights on armoured vehicle trends, global procurement activity and lessons learnt from the battlefield, as well as to conduct business with the world's leading vehicle, system and component manufacturers and smaller specialist suppliers.



## Contracts

### Iveco Latin America and the Brazilian Army in €2.5 billion Defence Vehicle Supply Contract

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The Brazilian Army and Iveco Latin America today signed a contract for the supply of 2044 units of the base model of the new family of armoured personnel carriers (VBTP-MR). The vehicles will replace the old models Urutu used today by the Brazilian armed forces. The contract is valued at 6 billion Brazilian Reais (about €2.5 billion) over 20 years.

The manufacturing batch of 2044 units is planned to start in 2012, with completion in 2030. The production of models, including engines, will take place in Brazil, where Iveco will prepare a production area purposely designed to meet this demand. The local supply chain will involve more than 100 direct suppliers and some hundreds of indirect suppliers.

The agreement was signed at a ceremony held at the Army Headquarters in Brasilia, attended by General Enzo Martins Peri, Commander of the Brazilian Army, General Fernando Sörgio Galvao, Chief of Army Staff, the President of Iveco Latin America, Marco Mazzini and the General Manager of Iveco Defence Vehicles, Pietro Borgo.

The VBTP-MR project is part of the National Defence Strategy which includes the reorganization of domestic defence to ensure that the equipment needs of the Brazilian armed forces are supported by best-in-class technology.

For the Brazilian Army, the VBTP-MR project will increase the effectiveness of the land forces, increasing capacity to act in several missions where the use of this type of vehicle is suitable, with different settings (personnel carrier, reconnaissance, rescue, ambulance, etc.) to meet various operational needs.

#### THE VBTP-MR VEHICLE □

The VBTP-MR is a family of diesel engine vehicles with a GVW of 18 tonnes, 6x6 drive, amphibious capability and capable of carrying 11 soldiers. The basic dimensions are 6.91 metres long, 2.7 metres wide and 2.34 metres high. The model can be equipped with a turret armed with remote control operation for several different applications. The model can be transported by an aircraft of type C-130 Hercules.

This family of armoured vehicles is currently under development. The work is being carried out jointly by the Brazilian Army (through the project Mobility Strategy and the DCT - Department of Science and Technology) and Iveco. Around 30 million Brazilian Reais (€12 million) has been applied to the definition of this project in which major specialist Brazilian companies are also

involved.

The first prototype is under construction in Brazil and will be ready in the first half of 2010. Another 16 units of a pilot batch will be produced by Iveco in Brazil between 2010 and 2011.

The VBTP-MR family is the result of the bidding process launched by the Army in 2007 and won by Iveco. One of the decisive factors in this choice was the experience of Iveco Defence Vehicles, which designs, produces and markets a full range of military vehicles, including models similar to the Brazilian VBTP-MR.

A full-scale mock-up of the VBTP-MR was exhibited at the Latin America Aero & Defence (LAAD), the largest military equipment fair in Latin America, held in Rio Centro, Rio de Janeiro in April 2009.

### Iveco

Iveco designs, manufactures, and markets a broad range of light, medium and heavy commercial vehicles, off-road trucks, city and intercity buses and coaches as well as special vehicles for applications such as fire fighting, off-road missions, defence and civil protection.

Iveco employs over 27,000 people and runs 27 production units in 16 Countries in the world using excellent technologies developed in 6 research centres. Besides Europe, the company operates in China, Russia, Australia and Latin America. More than 6,000 service outlets in over 100 Countries guarantee technical support wherever in the world an Iveco vehicle is at work.



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## Contracts

### Oshkosh Defense Awarded \$5 Million LVSR Delivery Order



OSHKOSH, Wis. — Oshkosh Defense, a division of Oshkosh Corporation (NYSE:OSK), has been awarded a delivery order to an existing contract with the U.S. Marine Corps Systems Command (MARCORSYSCOM) for more than 10 Logistics Vehicle System Replacements (LVSR).

The delivery order for the cargo variant of the vehicle is valued at more than \$5 million and brings the total number of LVSRs under contract to 875.

Production and delivery of the LVSRs will be completed in October 2010, with all variants manufactured in the company's Wisconsin facilities. Oshkosh delivered its requirement of nearly 40 LVSRs in November, and set a record production number for the program when it produced more than 40 in October.

With improved survivability, mobility and performance, the next-generation LVSR expands on the original Logistics Vehicle System (LVS) produced by Oshkosh Corporation in the early 1980s. The Oshkosh® LVSR is used by the U.S. Marine Corps for the on- and off-road transportation of heavy payloads, such as munitions, fuel, water and heavy equipment.

The Oshkosh LVSR vehicle is equipped with the Oshkosh Command Zone™ embedded diagnostics system and the company's patented TAK-4® independent suspension system for superior off-road mobility in the most severe environments. The LVSR comes in three variants – cargo, wrecker and fifth-wheel – and features an on-road payload capacity of 22.5 tons and an off-road payload capacity of 16.5 tons.

Oshkosh has the available capacity, highly skilled workforce and proven manufacturing capability to deliver this order and vehicles for all other Marine Corps and Defense programs, including the MRAP All Terrain Vehicle (M-ATV) and the U.S. Army's Family of Medium Tactical Vehicles (FMTV), as well as any surges in production.

## Contracts

### Plasan Awarded Additional Contract for M-ATV Armor Kits

Bennington, Vermont -- Plasan, a global leader in the field of combat-proven survivability and armor solutions for vehicles, airborne platforms and personal protection, today announced it has won an additional contract for the delivery of 400 M-ATV armor kits as sub-contractor to Oshkosh Defense.

Plasan has already delivered 3,200 M-ATV armor kits for the \$3.3 billion contract awarded by U.S. Department of Defense to a team led by Wisconsin-based Oshkosh Corporation and Plasan North America to produce 6,619 M-ATVs for deployment in Afghanistan.

Plasan North America and its local sub-contractors have made advance preparations to comply with strict composite specifications and a tight manufacturing schedule. Through the application of the modular Kitted Hull concept, developed by Plasan, all armor parts and components are sent to Oshkosh where they are applied to the vehicle on the assembly line, increasing manufacturing efficiency and reliability. Plasan's production capabilities are complemented by a comprehensive supply chain that encompasses suppliers of materials, equipment and solutions throughout the U.S. This extensive network provides the flexibility to expand or reduce production volumes according to demand.

Ms. Yael Viesel, Marketing and Business Director for North America at Plasan, said: "This new order marks the sixth additional order for armor kits in five months. These increased orders are a vote of confidence in Plasan's proven track record of on-time delivery. Our goal is to provide the best, most survivable solution for the war fighter. Our survivability systems reflect the experience our designers and engineers have from both their education and also from their time as soldiers."

## Defence Industry

### Army fires TALON Laser-Guided Rocket Rounds from OH-58D Kiowa Warrior

Eglin AFB, Fla. -- The U.S. Army fired two TALON Laser-Guided Rocket guided test vehicle rounds during the Aviation Multi-Platform Munition Demonstration.

TALON LGR is a cooperative development effort between Raytheon Company and Emirates Advanced Investments of the United Arab Emirates.

The TALON LGR rounds were launched from a U.S. Army OH-58D Kiowa Warrior and hit targets at 3,500 meters (2.17 miles). This exceeded accuracy requirements for the Department of Defense's Advanced Precision Kill Weapon System II program.

"In September, the U.S. Army clearly stated the need for a guided munition capable of being launched from the OH-58D Kiowa Warrior," said Dr. Taylor W. Lawrence, Raytheon Missile Systems president.

"TALON LGR can meet that operational need. U.S. forces will be able to obtain a fully qualified laser-guided rocket that meets or exceeds all the guided 70 mm rocket requirements without expending tens of millions of dollars in research, evaluation and testing."

The TALON LGR is a low-cost, semi-active laser guidance and control kit that connects directly to the front of the legacy 2.75-inch unguided rockets fired from the OH-58D Kiowa Warrior. It requires no software or hardware modifications to the launcher or aircraft platform and can be fired from any aircraft that fires 2.75-inch unguided rockets.

"LGR is a highly reliable precision rocket solution for a variety of fixed- and rotary-wing platforms," said Hussain Al Hammadi, EAI's chief executive officer. "The success of this demonstration further proves the TALON LGR will provide warfighters with a precision capability they've never had before."

TALON LGR fills the critical operational capability gap between unguided rockets and guided, heavy anti-tank missiles.

"This year's small-guided munition demonstration is critical because we're exploring options to provide precision-guided capabilities to our combatant commanders in Iraq and Afghanistan," said Col. Michael Cavalier, Joint Attack Munitions Systems project manager. "This demonstration has given us a better understanding of our options with regard to developing a precision-guided weapon that can be launched from a Kiowa Warrior."

EAI continues to be the region's leader in providing modernized defense capabilities to the United Arab Emirates.

### Defence Industry

#### BAE Systems Receives French Order For BvS10 MK II All-Terrain Vehicle

ORNSKOLDSVIK, Sweden - BAE Systems has been awarded a contract by the Direction generale de l'armement (DGA) - French Armament Procurement Agency - for 53 BvS10 MkII vehicles, a new and improved version of the all-terrain vehicle in service with the Dutch and British armed forces. With options, the total value of the contract could reach €220 million for 129 vehicles.

The contract is for three variants - troop carrier, command post and logistic vehicle - together with a comprehensive through-life support package. The project will be run in close cooperation with French partners, such as Panhard and EADS and deliveries are to commence 2010.

"The French requirements were very challenging and so it was particularly rewarding to win this contract," said Jan Söderström, managing director for BAE Systems' Vehicles business. "The contract acknowledges the high performance and strong market position of our battle-proven BvS10 and secures the continued development of the vehicle."

More than 35 years' experience of articulated vehicle

design and production in Örnsköldsvik, and in-theatre experience from countries like Afghanistan and Chad, has fed into development of the BvS10.

"The MkII version of the BvS10 completely fulfils the French Army's requirements in terms of protection, mobility and payload while maintaining the flexibility to perform across the spectrum of military operations," says Söderström.

### About BAE Systems

BAE Systems is the premier global defense, security and aerospace company delivering a full range of products and services for air, land and naval forces, as well as advanced electronics, security, information technology solutions and customer support services. With approximately 105,000 employees worldwide, BAE Systems' sales exceeded BJ18.5 billion (US \$34.4 billion) in 2008.

### Defence Industry

#### Increased scope of CROWS II framework agreement



Kongsberg -- has signed a contract with the US Army increasing the number of Protector Weapon Control Systems within the existing CROWS II frame contract from 6.500 to 10.349 systems. The value may reach between 3 and 4.5 billion NOK.

The total scope of the agreement will depend on US Army's future demand and annual allocations.

KONGSBERG has also received a purchase order for systems valued at 950 MNOK as part of the extended frame agreement.

The Protector Weapon Control System protects military troops by allowing the vehicle's weapons to be operated from a protected position inside the vehicle.

The initial CROWS II framework agreement was disclosed on 22 August 2007.

### Contracts

#### Ceradyne Receives M-ATV Vehicle Armor Contract

Costa Mesa, Calif. -- Ceradyne, Inc. announced that it has received a multi-million dollar blanket purchase order from Plasan Sasa Ltd., Israel, for the production of armor components for the MRAP

All Terrain Vehicle (M-ATV).

Ceradyne plans to produce these parts in its expanded armor assembly plant in Irvine, California, for delivery to Oshkosh Corporation, the prime contractor. Oshkosh will assemble the components and deliver the M-ATV to the government.

All manufacturing procedures for these M-ATV components have now been approved and Ceradyne production commenced this month. It is anticipated that production and delivery will continue throughout 2010.

Marc King, Ceradyne's Armor Systems President, stated that Ceradyne was pleased to work in cooperation with Plasan in order to insure quality M-ATV parts are delivered on an expedited delivery schedule to Oshkosh in order to support our troops in the field.

